

Dual

506

Edition December 1979

Service Manual



Technical data

Measured values

Current

Line Voltage

Drive

Power consumption

Starting Time

Power Consumption

Platter

Platter speeds

Pitch Control Variation

Speed control (monitoring)

Total Wow and Flutter

Rumble

(according to DIN 45 500)

Tonearm

Tonearm Bearing Friction

(related to stylus tip)

Stylus Pressure

Cartridges

Weight

typical values. Rumble and wow and flutter values obtained with test record.

AC 50 or 60 Hz, changeable by changing motor pulley

110 – 125 V or 220 – 240 V, changeable

Dual 8-pole synchronous motor: precision flat belt for flywheel drive
approx. 10 watts

(to each nominal speed) approx. 2 seconds at 33 1/3 rpm

at 220 V, 50 Hz: approx. 75 mA

at 117 V, 60 Hz: approx. 140 mA

Non-magnetic, detachable, 1.1 kg, 304 mm ϕ

33 1/3 and 45 rpm

at both platter speeds. Adjustment range at 33 1/3 rpm approx. 1 semitone (6 %) with stroboscope for platter speeds 33 1/3 and 45 rpm, adjustable to 50 or 60 Hz.

DIN ± 0.07 %

WRMS ± 0.04 %

Unweighted 48 dB

Weighted 70 dB

Torsion-resistant tubular aluminum tonearm in fourpoint gimbal bearing

vertical 0.07 mN (0.007 g)

horizontal 0.15 mN (0.015 g)

from 0 - 30 mN (0 - 3 g) infinitely variable with 1 mN (0 - 1.5 g)

operable from 5 mN (0.5 g) stylus pressure up

with 1/2 inch screw-type attachment. These can be fitted with the special accessories no. 262 186 which can be obtained from trade dealers. Adjustable overhang 5 mm.

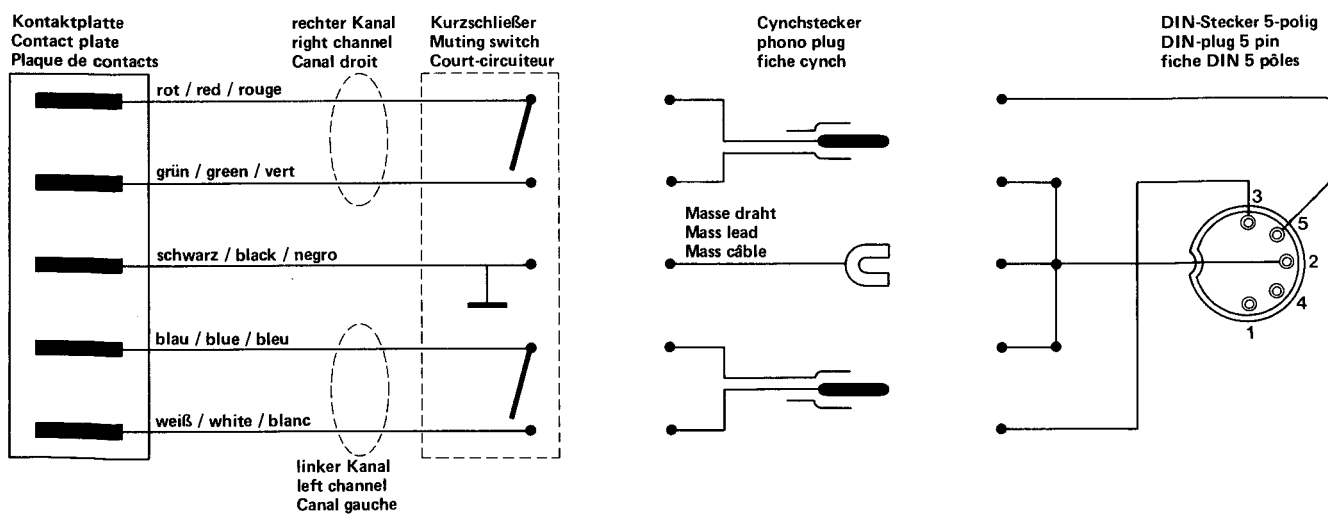
approx. 4.1 kg

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NOTE: The item numbers referred to in the text are identical with those in the illustrations, the exploded views, and in the parts lists.

Fig. 1 Pick-up connection diagram



Motor and Drive

Turntable and mechanism are driven by the motor **132** in (Fig. 16). The shaded-pole motor runs vibration-free in radially elastic mounts and has an extremely low magnetic leakage. The motor speed is independent of voltage, temperature, and load variations. It can only fluctuate with the mains frequency. Two motor pulleys adapt to the mains frequency of 50 Hz or 60 Hz (see pulley **116** in Fig. 2).:

Part no. 234 453 pulley for 50 Hz

Part no. 234 454 pulley for 60 Hz.

The driving force is transmitted to the turntable by the belt **15**.

Speed Selection

To adjust the turntable speed to 33 1/3 or 45 rpm, the belt is adjusted to the one or the other step of the motor pulley **116** (see Fig. 3). This is done by operating the knob **16** that will shift the change-over lever into the desired speed position through the lever **101** and the spring lever. As long as the platter is turned off, the change-over lever is blocked by the bar **12** and the speed is only pre-selected. As soon as the record player is turned on and the turntable **7** starts running, the blocking bar **12** will release the change-over lever. The latter will then shift the belt **15** to the one step of the motor pulley **116** that corresponds to the desired speed.

Turntable

The turntable **7** is fixed to the turntable bearing tube by lock tab **134**. To remove the turntable, lift its top layer through one of the cutouts and rotate the turntable so that the recess is above the motor pulley. Pull the belt **15** from the pulley **116** and place it onto the turntable. Rotate the latter further until the cutout is above the lock tab **134**. Slacken the screw **133**. Press the holding bar **134** outwards and remove the turntable **7**.

Belt

To replace the belt, first remove the turntable as above described, then remove the belt **15**. Place the new belt on the pulley part of turntable **7**.

NOTE: the ground (mat) side of the belt should face the pulley. Install the turntable. Place the belt onto the motor pulley **116**.

To Replace the Motor Pulley

1. Remove belt **15** from pulley **116** and remove the turntable. Remove the toothed belt **109**.
2. Disengage the tension spring **114** from the shield **122**.
3. Unscrew the hex. nut **110**. Remove the set cam **111**, belt pulley **112**, and counter bearing **113**.
4. Slacken the grub screws **117** and slide off the motor pulley **116**. Place the replacement pulley onto motor shaft. Remove the taper sleeve. Pay attention to the internal distance spring. Position the motor pulley at proper height above the mounting plane — see Fig. 3 — and uniformly tighten the grub screws **117**. Place the taper sleeve into the motor pulley **116**.
5. Mount the counter bearing **113**, the belt pulley 2 **112**, and the setting cam **111**, tighten with hex. nut **110**. Replace tension spring **114** and toothed belt **109**. Mount the turntable **7**. Place belt **15** onto motor pulley **116**.
6. To adjust the rated speed: adjust the knob **16** to its mid position. Slacken or tighten the hex. Nut **110** to achieve the rated speed.

Tuning to the Pitch of Tone Level

This tuning feature is independent of the power and controls both turntable speeds. For 33 1/3, the control range is max. 6 % or about 1 semitone.

Fig. 2

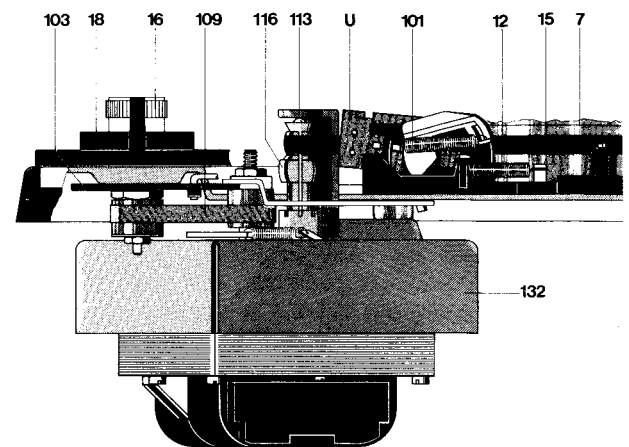


Fig. 3

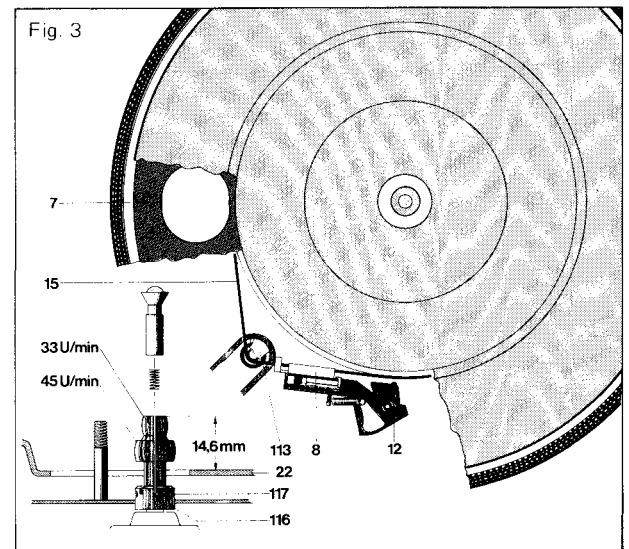


Fig. 4

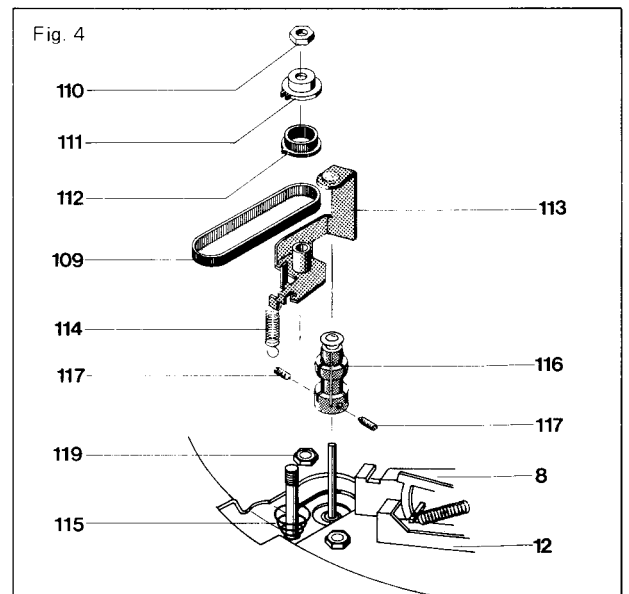
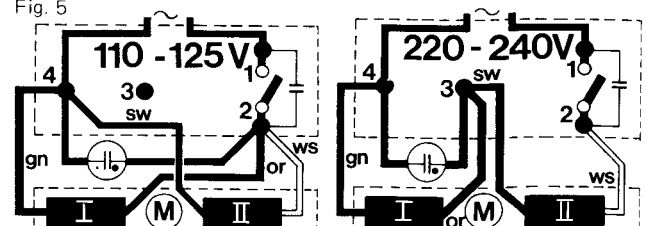


Fig. 5



Rotate the knob **16** to move the belt pulley **112**. This rotary motion is transmitted by the toothed belt **109** to the belt pulley **1** **105**, see Fig. 2. As a result, the counter bearing **113** and the taper sleeve of the motor pulley **116** are shifted up or down. As an effect of the taper sleeve, the motor pulley diameter is reduced or increased, respectively, thus permitting to change the rated speed within the range of $\pm 3\%$.

Stroboscope

Accurate setting of the platter speeds 33 1/3 rpm and 45 rpm can be checked during play with the aid of the stroboscope device. On the platter **4** rotating at exactly the desired speed, the lines of the stroboscope appear to stand still. If the lines of the stroboscope move in the direction of the platter rotation, the platter speed is too high. If the lines move backwards the platter is rotating more slowly than nominal speed. The four rows of stroboscope marks on the edge of the platter, taken bottom to top, are for the following speeds: 33 1/3 rpm at 60 Hz, 33 1/3 rpm at 50 Hz, 45 rpm at 60 Hz, 45 rpm at 50 Hz. Adjustment of the platter speed is carried out using the regulating knob **16**.

Fig. 6

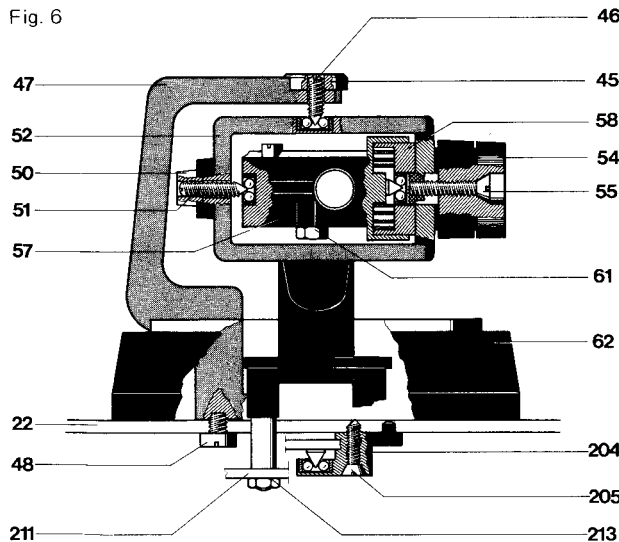
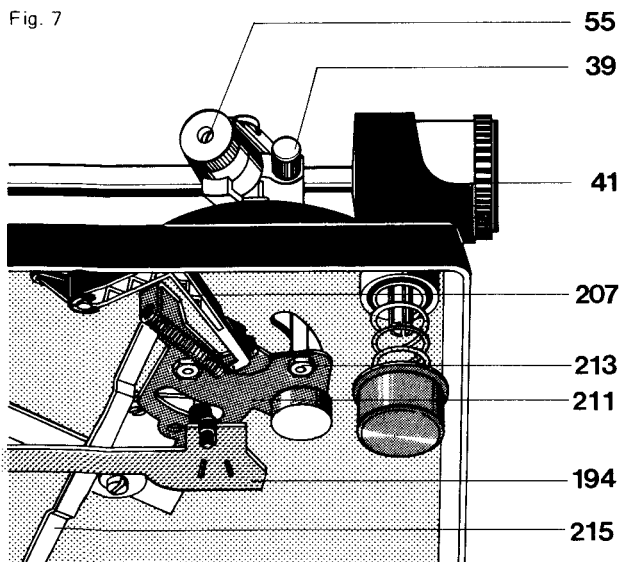


Fig. 7



Tone arm with Bearings

The light-weight torsion-resistant metal-tube tone arm has a universal gimbal bearing characterized by four hardened and lapped steel points located in high-precision ball bearings. The tone arm bearing friction is thus reduced to a minimum, namely

less than 0.07 mN or 0.007 gr in vertical and
less than 0.15 mN or 0.015 gr in horizontal direction
referred to the stylus point.

This ensures particularly satisfactory tracking conditions. Before adjusting the tracking force in compliance with the pickup system used, the tone arm to its balanced position while the tracking-force scale is in the zero position. For coarse balancing, shift the weight **41**, for fine balancing, rotate the weight. The tracking force is produced by tensioning the helical spring located in the spring case **63**. The latter has a scale with marking points permitting exact adjustment of the tracking force within the range 0 – 30 mN (or 0 - 3 g).

To Remove the Tone arm Complete with Bearings

1. Mount the record player in the servicing fixture. Adjust the tracking-force scale **54** to zero. Lock the tone arm **40** in place. Remove the weight **41**.
2. Adjust record player in head position. Remove shield **158**. Unsolder the tone arm leads from terminal strip **156**.
3. Unhook the tension spring **226** from the bearing bracket **224**. Rotate bearing part **195** through 90° degrees and remove it. Detach the setting bar **194**.
4. Unhook the tension spring **214**. Remove lock washer **210** and skating lever **207**.
5. Remove lock washer **217** and disk **216**. Detach the shut-off bar **215** from the segment **211**.
6. Slacken the hex. nuts **213** and the screw **204**. Remove the bearing **205** and the segment **211**.
7. Grip the Frame **47** and the tonearm **40**. Loosen the machine screw **48** and take off the tonearm and frame.

To install the tone arm, proceed in reverse sequence; however, make sure the segment **211** is properly adjusted as described on page 6.

To Remove the tonearm or the spring housing

1. Secure the unit in a repair stand. Turn the rotary turn switch **54** to the zero position. Lock the tonearm **40**. Remove the counterweight **41**.
2. Turn the unit over. Remove the screening sheet **158** and solder off the tonearm connections at the connection plate **156**. Turn the unit the right way up.
3. Remove the fillister head screw **55**. Remove the rotary turn switch **54** and the washer **53**.
4. Loosen the nut **54** and the grub screw **46**. Draw the tonearm **40** complete with bearing **56** from the bearing race **49**. The spring housing **52** or the tonearm **40** may now be changed.

Reassembly involves the reverse procedure.

To Adjust the Tone arm Bearings

Exactly balance the tone arm. Both bearings should have a small, just perceptible backlash. Proper adjustment of the horizontal bearing is achieved if the tone arm can freely slide from the record inside to outside while the anti-skating adjustment is 0.5. Proper adjustment of the vertical bearing is achieved when the carefully kicked tone arm swings into balanced position. Adjust the backlash by grub screws **46**, **51** for the horizontal and vertical bearing, respectively.

Fitting a 1/2 inch cartridge

If a cartridge with 1/2 inch standard mount is to be fitted, the conversion kit **44** Number 262 186 is necessary. The proper method of fitting is shown in fig. 8.

Also the decorative cover should be removed from the counterweight **41** and should be fitted with the compensatory weight to be found in the conversion kit **44**.

Anti-Skating Device

To adjust the anti-skating force, operate the pointer scale provided on the cover **62**. Depending on this adjustment, the non-symmetric cam disk will guide the skating lever **207** out of the tone arm pivot point. The anti-skating force is transferred by the tension spring **214** to the segment **211** and, hence, to the tone arm **40**.

The factory adjustment is optimal for any stylus having a spherical tip radius of $15\ \mu\text{m}$ or an elliptical tip radius $5/6$ by $18/22\ \mu\text{m}$. These factory-adjusted values may be varied only in an authorized Dual service workshop using a Dual Skate-O-Meter and a test record.

Tone Arm Lift

Move the lift control bar **219** to the front () or LIFT position; this will rotate the lift cam **223** and operate the setting bar **194** and the lifting bolt that will lift the tone arm. In this way the tone arm can be lifted from or lowered on any point of the record except in the shut-off range.

Move the bar **219** to the rear () or LOWER position; this will release the setting bar **176**. The pressure spring **184** will return the lifting bolt **185** to its operating position and the tone arm **50** will be lowered softly, braked by the silicone oil in the lifter tube.

To Adjust the Lift Height

Slightly rotate the adjusting sleeve **181**. The stylus should be lifted from the record by 5 to 7 mm.

To Replace the Lift Plate

1. Fasten the record player in the service jig and lock it in place.
2. Adjust record player to head position.
3. Detach the tension spring **226** from the bearing bracket, **224**. Rotate bearing part **195** through 90° degrees and remove it. Remove the setting bar **194**.
4. Detach the tension spring **214**, slacken the lock washer **217** and remove the skating lever **207**.
5. Remove lock washer **217** and disk **216**. Detach shut-off bar **215** from segment **211**.
6. Slacken hex. nuts **213** and screw **204**. Remove counter bearing **205** and segment **211**. Remove lock washer **188** and disc **187**, disengage pawl **186**.
7. Remove screw **183**, and remove lift plate assy. **182**.

To replace the lift plate **182**, proceed in reversed sequence, but look for proper Adjustments (described below) when you fix the segment **211**.

Starting and Shutting Off

Swinging-in of the tone arm **40** causes rotation of segment **211**. As a result, pawl **164** and shift arm **172** will operate the power switch **143** causing the motor **123** and turntable **7** to rotate. After the record has been played, the dog **M** of the turntable (Fig. 11 b) will operate the shut-off lever **34**. During play-back, the shut-off bar **215** is dragged in proportion to the motion of segment **211**. For records **116** to **122** mm in diameter, the shut-off lever **34** is gradually pushed to dog **M** by the shut-off bar **215** in the shut-off range, see Fig. 10. When the dog **M** contacts the shut-off lever **A**, the carrier **37** will move the shift arm **172** to its zero position and the power switch will interrupt the supply.

At the same time the lift bar **218** coupled to the shift arm **172** will operate the tone arm lift and the tone arm **40** will be lifted.

Fig. 8

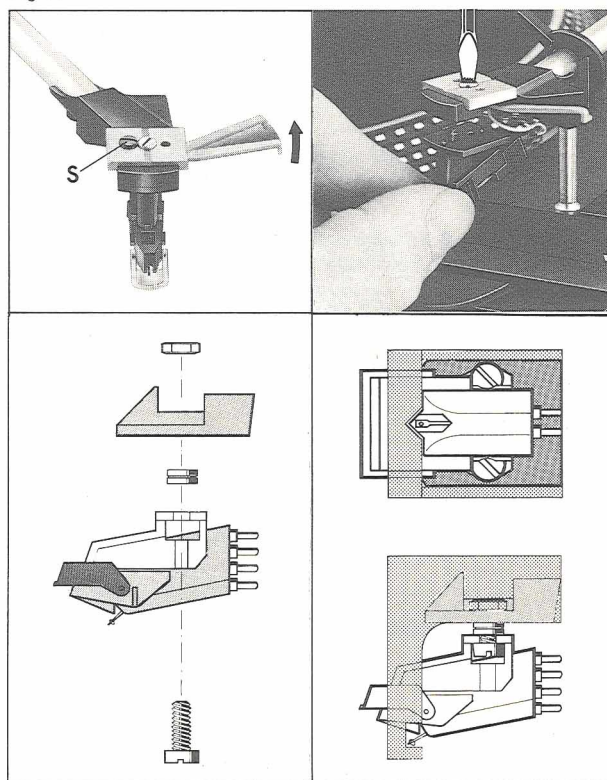


Fig. 9

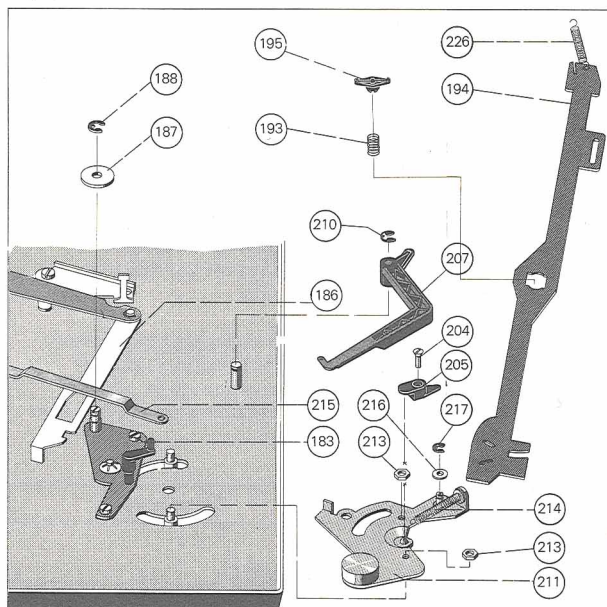
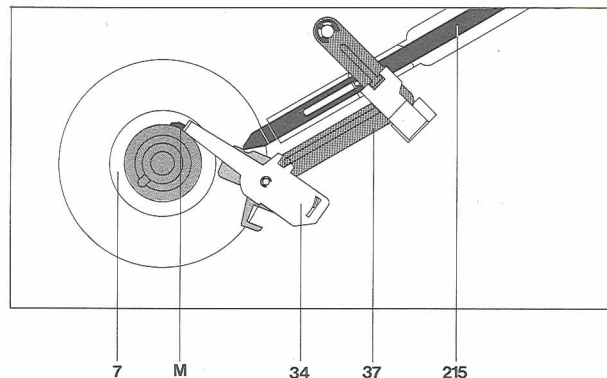


Fig. 10



Adjustments

1. Segment

- Lock the tone arm **50** in place. Record player in head position. Moreover, a play of 0.3 to 0.5 mm should be provided between the pawl **186** and the stop **A** of segment **211**, adjustable by slackening the hex. nuts **213** and shifting the segment **211**.
- The excenter **S** on segment **211** can be used to vary the shut-off point for records 116 to 122 mm in diameter.

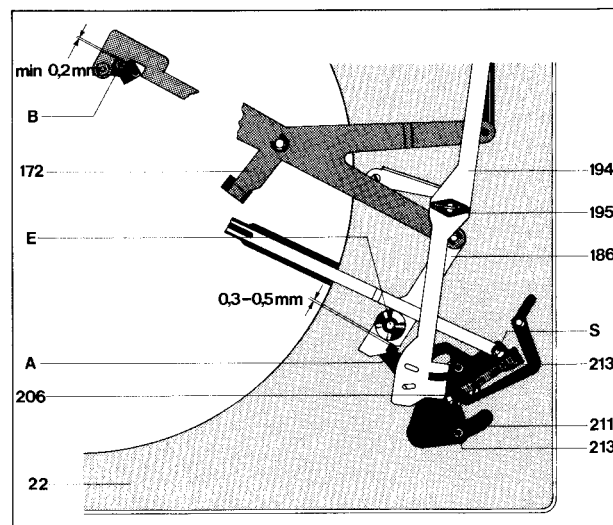
2. Pawl

Swing in the tone arm **40**. Make sure there is a play of 0.2 to 0.5 mm between stop pin **B** of the shift arm **172** and the deck plate **22**. If necessary, adjust by rotation of excenter **E**.

3. Power Switch

Disconnect mains plug. Swing the tone arm **40** back to its support. Power switch **143** must not turn off before the tone arm has reached a position about 3 mm in front of the support. If necessary, adjust by bending the shift arm **172**.

Fig. 11



Defekt

Turntable does not start

Cause

- Belt **15** is not in place: mount the belt.
- Motor **132** is not powered: check switch base **142** and mains plug.
- Motor pulley **116** has come loose: tighten it.

Turntable speed unsatisfactory

- Motor pulley **116** not in compliance with mains frequency: exchange.
- Belt **15** slipping on pulley **116** or turntable **7**: clean all surfaces in contact, if necessary replace belt **15**.
- Rated speed maladjusted: readjust.

Stylus slides out of playing groove

Steel ball **166** of shut-off bar **166** missing

Tonearm does not set down on record or lowers too quickly when operating the cue control lever **190**

Excessive or insufficient damping as a result of contamination of the silicone oil in the lift tube

Repair

- Belt **15** is not in place: mount the belt.
- Motor **132** is not powered: check switch base **142** and mains plug.
- Motor pulley **116** has come loose: tighten it.
- Motor pulley **116** not in compliance with mains frequency: exchange.
- Belt **15** slipping on pulley **116** or turntable **7**: clean all surfaces in contact, if necessary replace belt **15**.
- Rated speed maladjusted: readjust.

Renew steel ball

Referring to page remove cue control plate **182**. Remove adjustment bush sleeve **181**. Remove lift pin **185** and compression spring **184**. Clean lift tube and lift pin. Smear lift pin evenly with "Wacker Silicone Oil AK 500 000". Reassemble components.

Replacement parts

Pos.	Part.-No.	Qty.	Description
1	214 054	1	Washer
4	220 213	1	Centering piece
6	263 375	1	Turntable lining
7	263 377	1	Turntable cpl.
8	234 428	1	Carrier cpl.
9	210 472	1	Fillister head screw
10	210 586	1	Washer
11	232 086	1	Tension spring
12	237 220	1	Locking rail cpl.
13	240 000	1	Tension spring
14	210 194	1	Grip ring
15	246 084	1	Flat belt
16	260 461	1	Control knob
17	239 270	1	Bearing bush
18	260 297	1	Speed lever
19	263 378	1	Speed cover
20	213 260	3	Grooved drive stud
21	237 414	3	Transport lock
22	263 379	1	Built-in plate cpl.
23	237 226	1	Spring suspension cpl. (motor side rear)

Pos.	Part.-No.	Qty.	Description
	237 227	1	Spring suspension cpl. (motor right front)
	237 228	1	Spring suspension cpl. (pick-up arm side rear)
	237 229	1	Spring suspension cpl. (pick-up arm side front)
24	230 529	4	Threaded coupling
25	236 710	1	Pressure spring (motor side rear)
	236 711	1	Pressure spring (motor side front)
	236 712	1	Pressure spring (pick-up arm side rear)
	236 713	1	Pressure spring (pick-up arm side front)
26	200 725	4	Rubber absorber
27	200 722	4	Pot
33	210 142	1	Locking washer
34	234 766	1	Throw-off lever
35	210 146	1	Locking washer
36	234 764	1	Friction plate
37	234 762	1	Carrier
39	260 428	1	Clamping screw

Pos.	Part-No.	Qty.	Description	Pos.	Part-No.	Qty.	Description
40	264 020	1	Tonearm cpl.	145	230 148	1	Switch angle
41	263 263	1	Weight cpl.	146	219 200	1	Catch spring
42	263 258	1	Tonearm head cpl.	147	242 095	1	Cover
43	261 929	1	Tonearm head cpl.	148	210 498	1	Fillister head screw
44	262 186	1	1/2 inch conversion kit	149	231 079	1	Cable clamps cpl.
45	249 383	1	Counter nut	150	214 602	1	Socket AMP
46	234 651	1	Grub screw	151	232 996	1	Mains lead Europe
47	263 081	1	Frame cpl.	152	232 995	1	Mains lead USA
48	242 677	1	Fillister head screw	153	207 301	1	Phono pick-up cable Cynch
50	246 884	1	Counter nut	154	209 426	1	Cynch plug black
51	234 634	1	Grub screw	155	209 425	1	Cynch plug white
52	263 329	1	Bearing frame	156	237 238	1	Pick-up connection plate
53	261 798	1	Washer	157	210 480	2	Fillister head screw
54	248 989	1	Rotary knob	158	236 080	1	Screen plate
55	249 097	1	Raised countersunk head screw	159	210 480	2	Fillister head screw
			M 4 x 8	165	236 950	1	Stop bush
			M 2.5 x 12	166	209 357	1	Ball
56	263 340	1	Bearing cpl.	167	232 104	1	Ball bed
57	263 331	1	Spring housing	168	210 469	2	Fillister head screw
58	236 069	1	Fillister head screw	170	210 626	1	Washer
59	260 135	1	Lifting plate	172	234 756	1	Switch arm
60	210 597	1	Washer	173	210 146	3	Locking washer
61	262 294	1	Screw	174	210 196	1	Grip ring
62	263 380	1	Rear cover	175	234 760	1	Engaging lever
63	200 444	7	Spring washer	176	234 799	1	Tension spring
64	260 320	1	Cam disc	177	237 785	1	Wire spring
65	242 298	1	Washer	178	210 586	1	Washer
66	228 113	1	Washer	179	234 759	1	Screw bolt
67	210 146	1	Locking washer	181	234 800	1	Adjustable adaptor
68	260 328	1	Stroboscoppisma	182	263 383	1	Lift plate cpl.
69	263 381	1	Front cover	183	210 472	1	Fillister head screw
70	263 334	1	Tonearm rest cpl.	184	234 798	1	Pressure spring
			4.2/8/1	185	234 795	1	Lift bolt
100	210 145	4	Locking screw	186	234 786	1	Catch
101	234 824	1	Switch lever	187	210 643	1	Washer
102	236 374	1	Clip spring	188	210 145	4	Locking washer
103	232 094	1	Connection part	189	234 789	1	Leg spring
104	232 079	1	Shouldered nut	190	210 146	3	Locking washer
105	232 097	1	Belt wheel II	191	210 469	2	Fillister head screw
106	240 035	1	Washer	192	237 969	1	Bearing angle
107	210 607	1	Washer	193	237 974	1	Pressure spring
108	210 362	1	Hex nut	194	263 721	1	Adjusting rail
109	232 076	1	Toothed belt	195	237 975	1	Bearing segment
110	244 104	1	Hex nut	199	209 436	4	Flat plug
111	241 641	1	Control curve	200	263 336	1	Stroboscope cpl.
112	241 642	1	Belt wheel I	201	249 092	1	Glow plate
113	241 644	1	Abutment	202	260 421	1	Glow lamp
114	233 777	1	Tension spring	203	210 469	2	Fillister head screw
115	232 615	1	Pressure spring	204	203 475	1	Countersunk screw
116	234 453	1	Drive roller cpl.	205	242 615	1	Counter bearing cpl.
	234 454	1	Drive roller cpl.	207	244 331	1	Skating lever
			50 Hz	210	210 146	3	Locking washer
			60 Hz	211	263 384	1	Segment
117	233 137	1	Grub screw	212	201 184	1	Adjusting washer
118	210 366	3	Hex nut	213	210 362	2	Hex nut
119	210 480	1	Fillister head screw	214	218 591	1	Tension spring
120	210 609	1	Washer	215	234 807	1	Switch-off rail
121	241 328	1	Screen plate	216	201 187	1	Sliding washer
122	232 841	3	Buffer	217	210 145	1	Locking washer
123	232 840	1	Insert plate	218	234 780	1	Lifting rail
124	241 570	1	Upper bearing stay	219	240 893	1	Grip hub cpl.
126	209 939	1	Sleeve	220	237 543	1	Rubber bush
127	242 587	1	Stator	221	234 778	1	Torsion spring
128	233 815	1	Fillister head screw	223	234 777	1	Stroke curve
129	241 571	1	Anchor cpl.	224	237 972	1	Bearing stay
130	241 572	1	Lower bearing stay	226	233 710	1	Tension spring
131	210 525	2	Fillister head screw	227	210 469	2	Fillister head screw
132	263 382	1	Motor SM 860/5	232	209 424	1	5-pole plug DIN
133	210 472	1	Fillister head screw	233	207 303	1	Phono pick-up cable cpl.
134	237 970	1	Holding rail				
136	241 885	1	Capacitor	261 952	1	CK 28 walnut console cpl.	
	242 822	1	HF-coche	261 953	1	CK 28 agate black console cpl.	
			10 nF/250 V	261 954	1	CK 28 agate brown console cpl.	
			47 µH	227 986	1	CH 6 Cover	
137	237 236	1	Bearing casing cpl.	260 480	1	Operating instructions	
138	236 759	1	Earthing spring	261 833	1	Operating instructions UAP	
139	210 515	3	Fillister head screw	260 491	1	Shipping carton CS	
140	236 335	1	Slide				
141	200 444	1	Spring washer				
142	233 012	1	Switch panel cpl.				
143	242 581	1	Mains switch cpl.				
144	239 732	1	Tension spring				

Alterations reserved!

Fig. 13 Exploded view 2

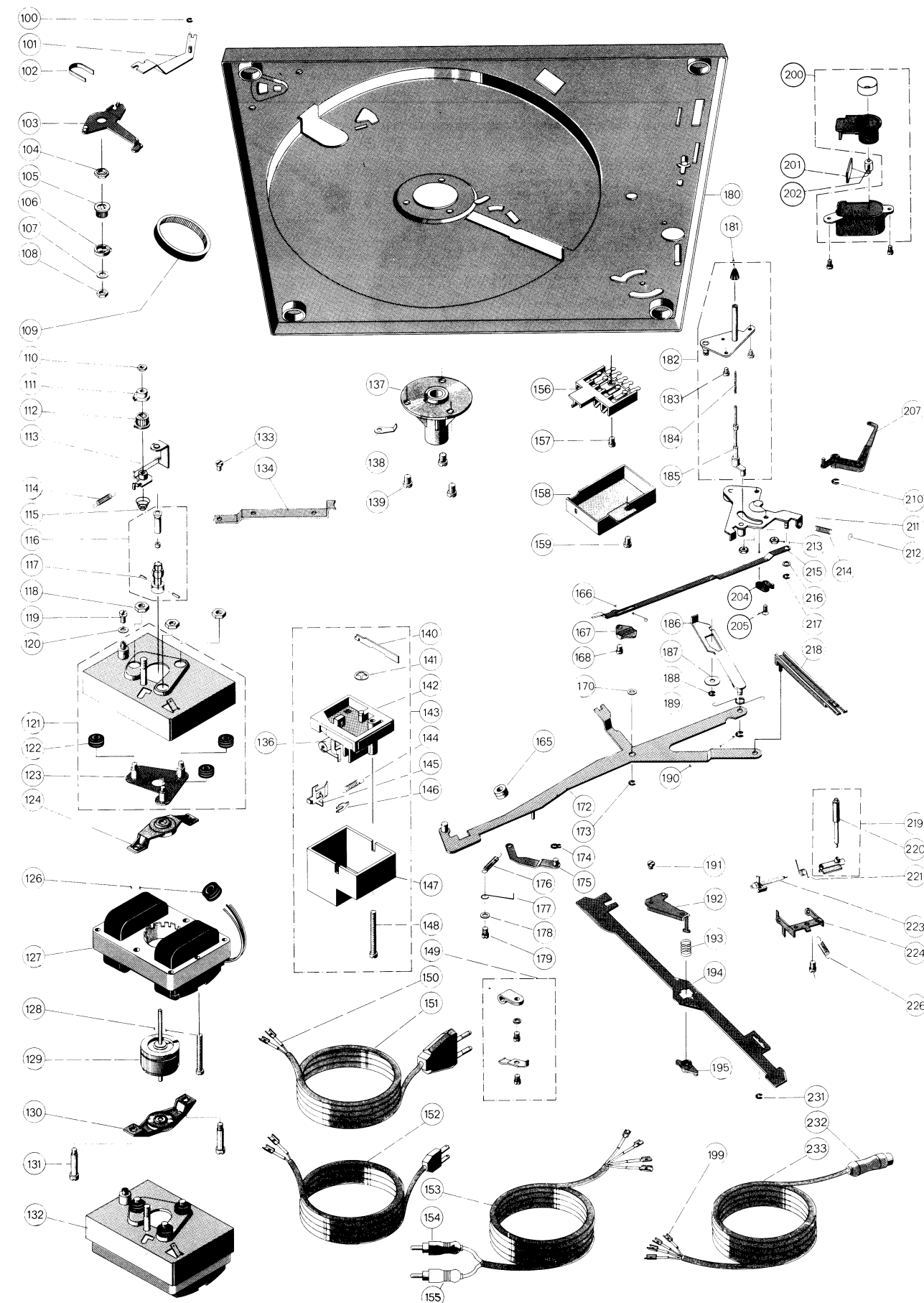
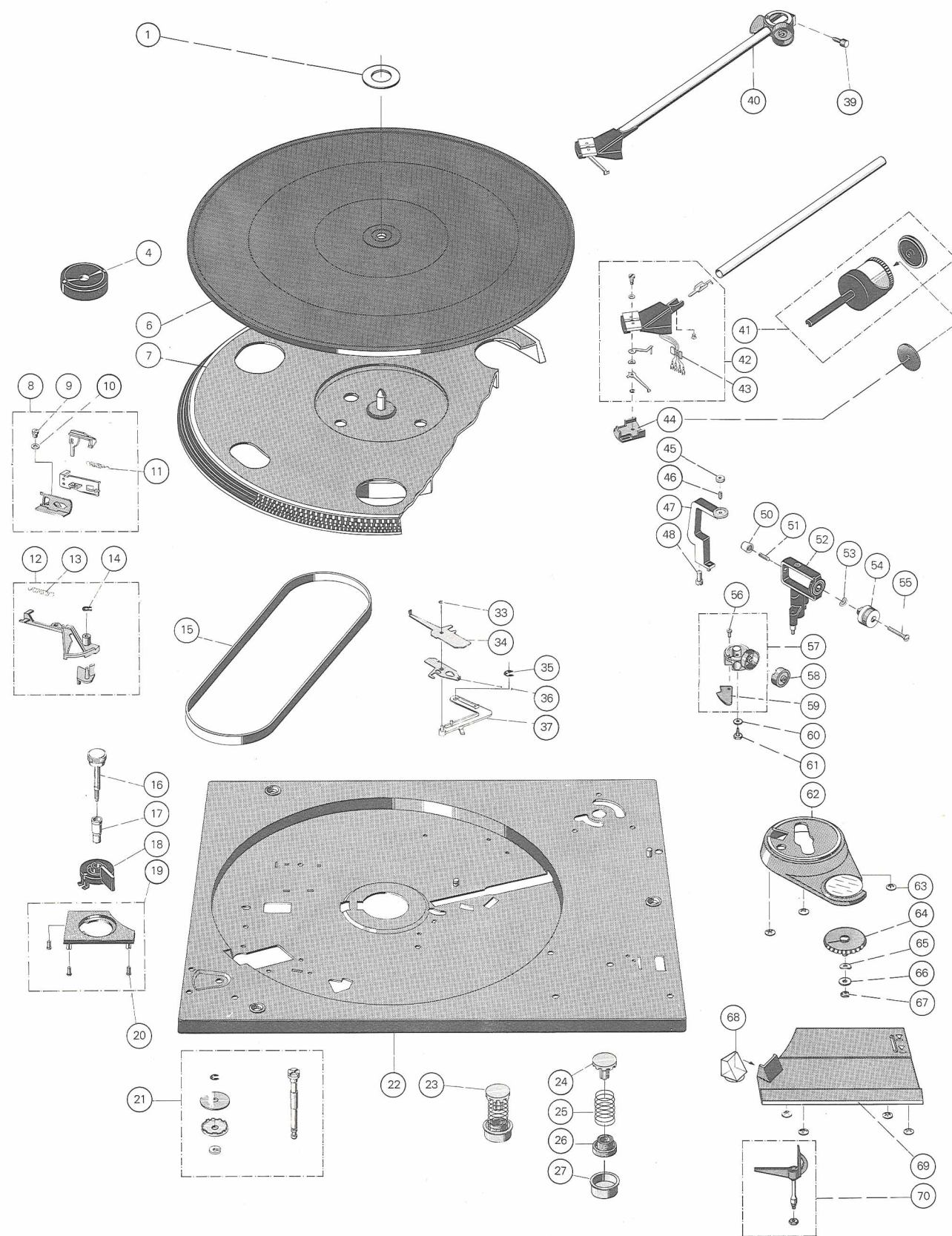


Fig. 12 Exploded view 1



Lubrication

All bearing and friction points of the unit are adequately lubricated at the works. Replenishment of oil and grease is only necessary after approximately 2 years of normal use of the record player as the most important bearing points (motor bearings) have sintered metal bushes.

Bearing points and friction faces should be lubricated sparingly rather than generously.

It is important that no oil grease should come in contact with the friction faces of the flat belt, drive pulley and flywheel rotor, otherwise slip will occur.

When using different lubricants, chemical decomposition can often take place. To prevent lubrication failure we recommend using the original lubricants stated below.



Renotac No. 342
adhesive oil



BP Super Viscostatic
10 W/30



Shell Alvania No. 2

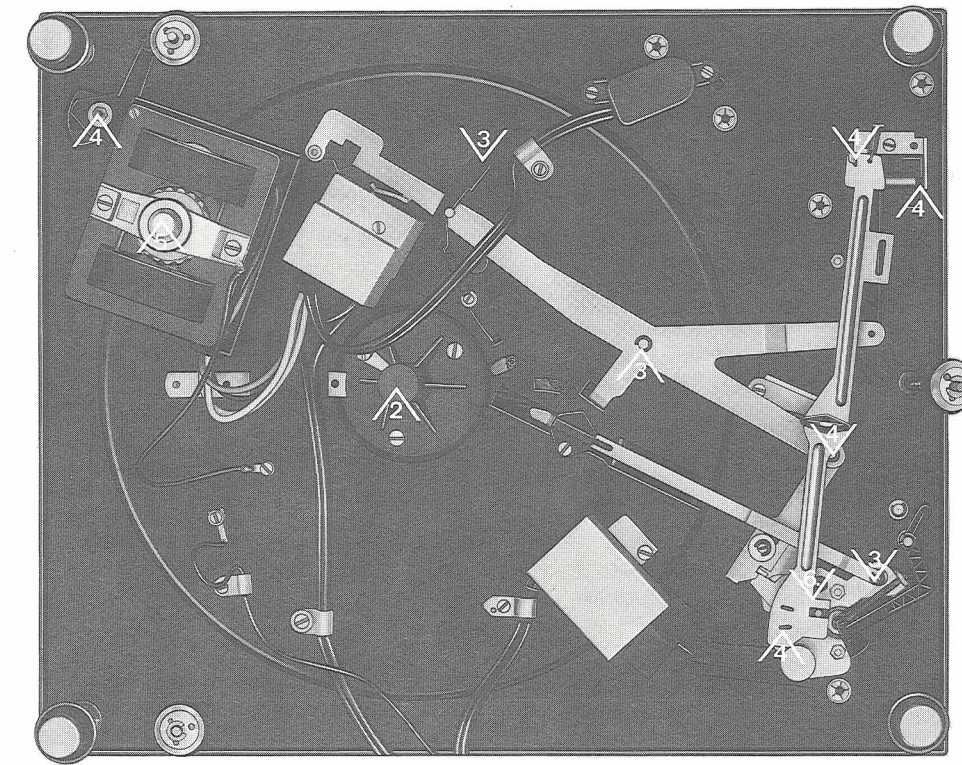


Isoflex PDP 40



Silicone oil
AK 500 000

Fig. 14



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